Trend Study 25C-20-03

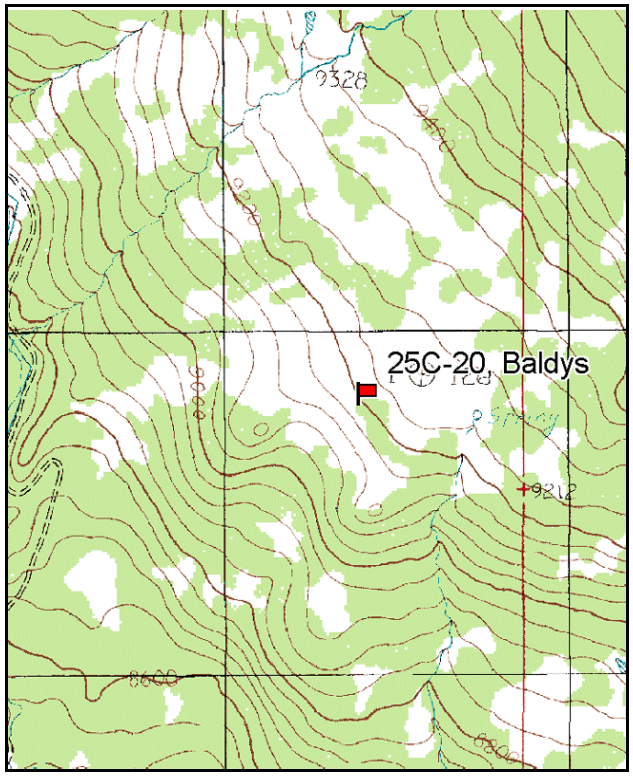
Study site name: Baldys . Vegetation type: Quaking Aspen .

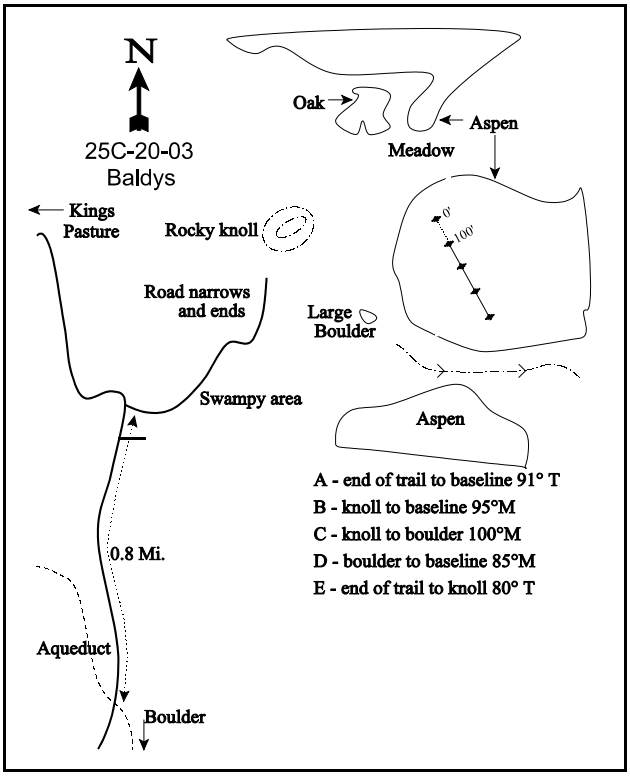
Compass bearing: frequency baseline 120 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line4 (71ft). No rebar.

LOCATION DESCRIPTION

From SR12 north of Boulder, turn onto the Garkane Power Plant road. Travel 1.8 miles to a fork, and go right toward Kings Pasture. Proceed 1.2 miles to a cattleguard and pipeline crossing. Continue 0.8 miles to a fork at a sharp curve in the road. Be sure to take the second fork, just 150-200 feet before the correct fork is another minor fork. Go 0.2 miles up a rocky road. Park at the creek, then walk across the creek and marshy area and follow the old road up the hill to the northeast. At the end of the road/trail where it tops out on the hill, take bearings to the clump of aspens where the study is located. The rocky knoll, shown on the map, is a small knoll. The aspen stand contains a spruce along line 2 and there are no other conifers around. From the knoll to the site is approximately 600 feet It is marked by short fenceposts. The 0-foot baseline stake is marked by browse tag #7172.





Map Name: Grover

Diagrammatic Sketch

Township 32S , Range 4E , Section Unsurveyed

GPS: NAD 27, UTM 12S 4207786 N, 462387 E

DISCUSSION

Baldy's - Trend Study No. 25C-20

This trend study samples a small aspen grove on deer and elk summer range in the Baldy's area below the rim of Boulder Mountain. It is separated from nearby groves of aspen by rolling meadows dominated by low rabbitbrush and grasses. Elevation at the study site is 9,200 feet with a southwest aspect on a 10% to 20% slope. The area receives considerable use by both elk and cattle and is considered a key area for elk during the summer. Pellet group frequency data indicates equal numbers of elk pellet groups and livestock pats in 1994. Pellet group data from 1998 estimated 7 deer, 32 elk, and 114 cow days use/acre (17 ddu/ha, 79 edu/ha, and 282 cdu/ha). Most of the cow pats were older, but cattle were in the area during the 1998 reading. About 12 elk were also seen near the site during the 1998 reading. Pellet group data from 2003 estimated 12 deer, 32 elk, and 7 cow days use/acre (30 ddu/ha, 79 edu/ha, and 16 cdu/ha). Cattle were in the area in late August of 2003. This area is in a deferred rotation grazing system with use occurring from mid-June to mid-October.

Soil at the site is moderately deep with an effective rooting depth of almost 14 inches. Rocks of volcanic origin are common on soil surface, with some large rocks scattered throughout the soil profile. Parent material is basalt. Soil texture is a sandy loam which is slightly acidic in reaction (pH 6.1). Soil organic matter is the highest on the unit at 6.1%. An organic matter rich "A" horizon is detectable to a depth of about 6 inches. Although the terrain has a slope of about 10% to 20%, erosion is not a problem due to excellent ground cover. Historically erosion is evidenced by the gullies which are common in the meadow areas, but the few observed in the aspen are no longer active.

An overstory of mature aspen characterizes the site. About half of the aspen was considered mature in 1987 and 1991. Line-intercept data from 1998 and 2003 estimated aspen canopy cover at 76% and 72% respectively. There were an estimated 866 trees/acre in 1987 and 799 in 1991. The young trees, averaging two feet in height, were moderately utilized in 1991. Aspen density data on the shrub density strips was mistakenly not collected in 1994. During the 1998 reading, aspen density was estimated at 700 trees/acre, 69% of which were classified as mature. Decadent aspen sampled were young trees which appeared to have been hedged in the past. Point-quarter data from 1998 estimated 428 mature trees/acre with an average trunk diameter of 9.2 inches. Density of aspen increased to 1,180 trees/acre in 2003 due primarily to an increase in young trees which accounted for 53% of the population.

The shrub understory is dominated by snowberry. These plants numbered about 2,399 plants/acre in 1987, increasing to 6,266 in 1991. The much larger sample used in 1994 and 1998 estimated 5,780 and 5,080 plants/acre respectively. The majority of the population is mature, although young plants remain abundant. Utilization of snowberry was moderate to heavy in 1987 and 1991, but mostly light in 1994 and 1998. Little use was apparent in 2003. Wood's rose is the second most abundant understory species with an estimated density of 1,540 plants/acre in 1998 and 2,440 in 2003. Utilization is light. A small population of serviceberry are found on the site. These plants averaged only 19 inches in height in 2003. These shrubs showed moderate to heavy use in 2003.

The herbaceous understory is the most important component of this summer range. Tree and shrub cover have a limiting effect on grass cover and frequency. Although grasses are diverse, only 4 species occur more than occasionally. Kentucky bluegrass, an increaser with heavy grazing, is the most abundant and it provided 57% of the grass cover in 1998 and 45% in 2003. Mutton bluegrass, obtuse sedge, and sheep fescue are also fairly common. Diversity of forbs is also good, with at least 19 perennial species sampled each year. Composition is poor however, with low growing increasers including western yarrow, trailing fleabane, and dandelion providing 49% of the forb cover in 1998. Other undesirable increaser forbs found on the site include the poisonous orange sneezeweed and Rocky Mountain iris. More common preferred forbs include thickleaf peavine, silvery lupine and American vetch.

1987 APPARENT TREND ASSESSMENT

Soil condition is good with little bare ground exposed. The site is dominated by mature aspen with snowberry in the understory. The aspen stand appears healthy with a good age class distribution. Since this is summer range, the herbaceous understory is the most important aspect of this site. Herbaceous plants are limited by the thick aspen overstory. Composition is poor with increasers, Kentucky bluegrass, western yarrow, spreading fleabane, Rocky Mountain iris, and dandelion dominating the herbaceous understory.

1991 TREND ASSESSMENT

Basic cover measurements have not changed much since 1987. Vegetative basal cover was unchanged. Rock and litter cover were also almost the same as before. Percent bare ground has increased from 2% to 5%. This is still a very low percentage for bare ground, so trend for soil is considered stable. There are not many browse species in very high frequencies on this site. Snowberry and aspen would be considered the most important. Aspen has decreased in numbers by 8%, while snowberry has increased by 62%. Percent decadency for both species is still low. Overall, trend for browse is up. The overall trend for herbaceous understory is stable. The sum of nested frequency of grasses has increased while frequency of forbs has declined slightly.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - stable (3)

1994 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1991. Bare ground has declined slightly. Trend for soil is stable. Trend for browse is also stable. Aspen was mistakenly not sampled in the shrub belt inventories in 1994, so no comparisons can be made. However, snowberry and Wood's rose show stable trends. The herbaceous understory is diverse and abundant with nearly equal amounts of grasses and forbs. Composition could be better however. The increaser, Kentucky bluegrass, dominates the grass component while the most numerous forbs consist of the increasers yarrow, orange sneezeweed, silvery lupine, and dandelion. Sum of nested frequencies for grasses and forbs have remained similar to 1991 estimates indicating a stable trend.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics between readings. Trend for browse is considered stable for understory shrubs, snowberry and Wood's rose. The aspen component on this site is overly mature with poor reproduction. Density of mature trees is currently stable but the proportion of young plants has steadily declined since 1987. Aspen does not provide an important forage source on this site due to the lack of available forage, but the health of the site depends on the aspen overstory. Trend for the herbaceous understory is up slightly, although the composition is poor. Sum of nested frequency of grasses declined slightly while frequency of forbs increased. Kentucky bluegrass is still the most abundant grass and it increased slightly in nested frequency. Weedy increaser forbs including western yarrow, trailing fleabane, orange sneezeweed, and dandelion, currently produce 59% of the forb cover. There are few of the late successional aspen community forbs present like sweetanise (*Osmorhiza occidentalis*), tall larkspur, meadowrue (*Thalictrum fendleri*) and wild carrot (*Ligusticum filicinum*). Production is up however, with grass cover increasing from 8% in 1994 to 14% by 1998. Forb cover increased from 8% to 26%.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - up slightly (4)

2003 TREND ASSESSMENT

Trend for soil remains stable with abundant protective ground cover to prevent erosion. There is very little bare ground exposed and herbaceous plants are abundant. Trend for browse is up, but shrubs are not a critical aspect of this summer range. However, aspen has increased in density due primarily to an increase in young plants (180 to 620 plants/acre). Wood's rose and snowberry also increased in density although both are more increasers and not utilized as forage on this site. Serviceberry also increased in density and is moderately to heavily browsed. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses remained similar to 1998 but sum of nested frequency of perennial forbs declined 22%. Production of perennial grasses remained relatively stable while cover of perennial forbs declined 49% (26% to 13%). Composition of forbs is still poor.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Management unit 25C, Study no: 20

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'94	'98	'03	'94	'98	'03
G	Agropyron trachycaulum	a13	a7	b34	a8	a7	.19	.19	.07
G	Bouteloua gracilis	-	-	1	-	1	.00	-	.00
G	Bromus anomalus	ab8	b18	ab15	a3	a2	.63	.00	.03
G	Bromus carinatus	a-	b9	a-	a-	ab3	-	.03	.18
G	Carex obtusata	a66	b126	ab110	a76	a53	.98	1.42	1.04
G	Dactylis glomerata	b16	a-	a1	a-	a-	.00	-	-
G	Festuca ovina	b101	b86	a40	a45	a40	.37	1.31	.53
G	Festuca thurberi	-	-	4	-	-	.07	-	-
G	Juncus balticus	b38	b47	b37	a-	a6	.59	-	.04
G	Koeleria cristata	-	-	4	-	-	.00	-	-
G	Muhlenbergia richardsonis	a-	ab10	a-	b13	a1	-	.48	.00
G	Poa fendleriana	a32	a1	b98	b80	b67	3.08	2.12	2.50
G	Poa pratensis	a134	c193	a142	ab143	bc161	2.33	7.86	5.70
G	Sitanion hystrix	ab12	bc40	cd45	a6	d70	.61	.12	2.34
G	Stipa columbiana	a-	a-	a-	b16	ab5	-	.13	.03
G	Stipa comata	1	1	-	-	-	-	-	-
G	Stipa lettermani	b59	ab24	b45	a14	a9	.76	.12	.16

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'94	'98	'03	'94	'98	'03
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		480	562	576	404	425	9.65	13.81	12.65
Total for Grasses		480	562	576	404	425	9.65	13.81	12.65
F	Achillea millefolium	$_{b}$154	$_{b}$140	$_{a}$92	$_{b}$126	$_{a}$91	1.79	3.59	1.49
F	Agoseris glauca	$_{a}$-	$_{a}$-	$_{a}$-	$_{a}$4	$_{b}$18	-	.03	.72
F	Allium cernuum	$_{c}$62	$_{b}$28	$_{ab}$20	$_{ab}$14	$_{a}$11	.20	.10	.33
F	Antennaria parvifolia	13	14	19	30	22	.11	.58	.29
F	Androsace septentrionalis (a)	-	-	3	9	-	.01	.16	-
F	Artemisia dracunculus	-	-	-	5	5	-	.01	.04
F	Arabis drummondi	$_{a}$3	$_{b}$24	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
F	Artemisia ludoviciana	2	-	-	-	-	-	-	-
F	Aster chilensis	$_{a}$-	$_{b}$23	$_{ab}$5	$_{b}$19	$_{b}$13	.04	.06	.08
F	Astragalus convallarius	-	-	-	5	-	-	.18	-
F	Castilleja linariaefolia	-	-	-	-	3	-	-	.03
F	Chenopodium album (a)	-	-	4	12	1	.01	.07	.00
F	Cirsium vulgare	5	-	3	3	3	.06	.03	.04
F	Collomia linearis (a)	-	-	-	2	-	-	.00	-
F	Cymopterus lemmonii	$_{bc}$33	$_{c}$40	$_{abc}$14	$_{a}$1	$_{ab}$25	.09	.01	.39
F	Descurainia spp. (a)	-	-	-	5	-	-	.03	-
F	Erigeron eatonii	-	-	-	-	2	-	-	.00
F	Erigeron flagellaris	25	12	27	27	32	.21	1.06	.26
F	Erigeron spp.	$_{b}$18	$_{ab}$4	$_{a}$-	$_{a}$3	$_{ab}$4	-	.00	.03
F	Eriogonum racemosum	-	3	-	-	-	-	-	-
F	Gentiana amarella heterosepala	-	2	-	-	-	-	-	-
F	Geranium richardsonii	36	26	45	29	17	.57	.28	.29
F	Helenium hoopesii	34	33	38	41	37	.85	2.51	1.20
F	Ipomopsis aggregata	-	-	-	-	4	-	-	.03
F	Iris missouriensis	$_{a}$21	$_{a}$17	$_{a}$16	$_{b}$24	$_{a}$5	.42	.42	.15
F	Lathyrus lanszwertii	$_{a}$-	$_{a}$-	$_{b}$20	$_{c}$58	$_{c}$28	1.14	3.83	1.40
F	Lomatium spp.	-	-	-	4	-	-	.15	-
F	Lupinus argenteus	$_{a}$7	$_{a}$12	$_{bc}$33	$_{c}$39	$_{ab}$19	1.66	2.32	.85
F	Lychnis drummondii	-	-	-	2	-	-	.00	-
F	Osmorhiza occidentalis	-	-	-	7	-	-	.01	-
F	Penstemon spp.	$_{a}$1	$_{a}$-	$_{b}$10	$_{a}$-	$_{ab}$3	.03	-	.00
F	Phacelia spp.	-	2	-	-	2	-	-	.03
F	Phlox austromontana	$_{a}$-	$_{a}$3	$_{b}$34	$_{ab}$15	$_{b}$28	.76	.60	.93

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'94	'98	'03	'94	'98	'03
F	Potentilla concinna	-	-	5	1	3	.03	.03	.06
F	Polygonum douglasii (a)	-	-	8	13	6	.02	.16	.02
F	Potentilla gracilis	$_{a}$-	$_{ab}$1	$_{b}$12	$_{ab}$4	$_{a}$-	.48	.06	-
F	Senecio multilobatus	$_{ab}$8	$_{a}$-	$_{b}$13	$_{ab}$12	$_{b}$11	.08	.07	.14
F	Taraxacum officinale	$_{b}$224	$_{b}$221	$_{a}$157	$_{b}$199	$_{a}$151	1.29	8.17	3.08
F	Tragopogon dubius	-	-	-	-	2	-	-	.03
F	Trifolium repens	1	-	-	-	-	-	-	-
F	Unknown forb-perennial	4	-	-	-	5	-	-	.07
F	Vicia americana	$_{ab}$68	$_{ab}$73	$_{a}$55	$_{b}$97	$_{a}$51	.32	1.62	.91
F	Viola spp.	-	3	-	4	7	-	.03	.24
Total for Annual Forbs		0	0	15	41	7	0.04	0.43	0.02
Total for Perennial Forbs		719	681	618	773	602	10.18	25.84	13.20
Total for Forbs		719	681	633	814	609	10.23	26.28	13.23

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25C, Study no: 20

Type	Species	Strip Frequency			Average Cover %		
		'94	'98	'03	'94	'98	'03
B	Amelanchier alnifolia	8	0	9	.44	-	.33
B	Populus tremuloides	0	32	35	.91	1.82	11.03
B	Ribes montigenum	1	0	0	.00	-	-
B	Rosa woodsii	19	29	25	.71	1.15	1.20
B	Symphoricarpos oreophilus	61	75	76	11.68	13.44	13.38
Total for Browse		89	136	145	13.75	16.42	25.96

CANOPY COVER, LINE INTERCEPT --
Management unit 25C, Study no: 20

Species	Percent Cover	
	'98	'03
Amelanchier alnifolia	-	.71
Populus tremuloides	76.00	72.19
Ribes montigenum	-	.43
Rosa woodsii	-	.65
Symphoricarpos oreophilus	-	12.35

POINT-QUARTER TREE DATA --
Management unit 25C, Study no: 20

Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Populus tremuloides	428	N/A	9.2	N/A

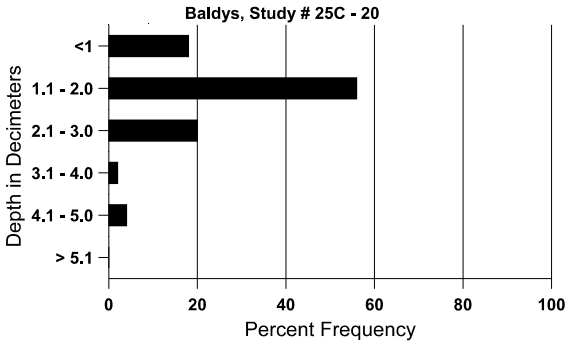
BASIC COVER --
Management unit 25C, Study no: 20

Cover Type	Average Cover %				
	'87	'91	'94	'98	'03
Vegetation	4.00	3.50	29.06	49.69	42.97
Rock	8.25	6.25	9.58	5.89	7.71
Pavement	0	0	.45	1.04	.57
Litter	85.75	85.25	60.19	81.25	65.61
Cryptogams	0	.25	0	.03	.15
Bare Ground	2.00	4.75	4.38	4.92	1.15

SOIL ANALYSIS DATA --
Management unit 25C, Study no: 20, Study Name: Baldys

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
13.5	43.2 (14.5)	6.1	62.7	16.7	20.6	6.1	28.4	329.6	0.6

Stoniness Index



PELLET GROUP DATA --
Management unit 25C, Study no: 20

Type	Quadrat Frequency			Days use per acre (ha)	
	'94	'98	'03	'98	'03
Rabbit	1	-	1	-	-
Elk	3	12	18	32 (79)	32 (79)
Deer	1	5	2	7 (17)	12 (30)
Cattle	4	5	4	14 (35)	7 (16)

BROWSE CHARACTERISTICS --
Management unit 25C, Study no: 20

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Amelanchier alnifolia											
87	**0**	-	-	-	-	-	0	0	0	0	-/-
91	**0**	-	-	-	-	-	0	0	0	0	-/-
94	**420**	-	-	420	-	-	71	0	0	0	10/6
98	**0**	-	-	-	-	-	0	0	0	0	-/-
03	**740**	-	460	140	140	-	22	16	19	5	19/9
Chrysothamnus nauseosus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	66	-	-	-	-	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Chrysothamnus viscidiflorus lanceolatus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	17/28
Populus tremuloides											
87	**999**	-	533	400	66	-	20	20	7	7	341/144
91	**932**	-	466	466	-	-	36	0	0	14	355/124
94	**0**	-	-	-	-	-	0	0	0	0	-/-
98	**1000**	-	480	480	40	120	10	0	4	4	-/-
03	**1180**	-	620	540	20	80	15	0	2	0	-/-
Ribes montigenum											
87	**66**	-	-	66	-	-	0	0	-	0	30/39
91	**66**	-	-	66	-	-	0	0	-	0	35/55
94	**60**	-	-	60	-	-	0	0	-	0	19/63
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Rosa woodsii											
87	**132**	-	66	-	66	-	0	50	50	0	-/-
91	**66**	-	66	-	-	-	0	0	0	0	-/-
94	**1340**	20	400	920	20	20	0	0	1	0	14/11
98	**1540**	240	560	940	40	20	1	0	3	0	20/15
03	**2440**	-	-	2400	40	100	0	0	2	.81	13/8

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Symphoricarpos oreophilus											
87	**2399**	66	733	1666	-	-	61	25	0	0	18/27
91	**6266**	66	1933	3533	800	-	29	7	13	4	16/24
94	**5780**	20	400	5380	-	-	3	0	0	0	16/24
98	**5080**	120	1240	3820	20	20	2	.39	0	0	20/29
03	**6600**	-	1080	5420	100	-	0	0	2	0	16/27